

Structural Health Monitoring with Fiber Bragg Grating and Piezo Arrays, Phase I

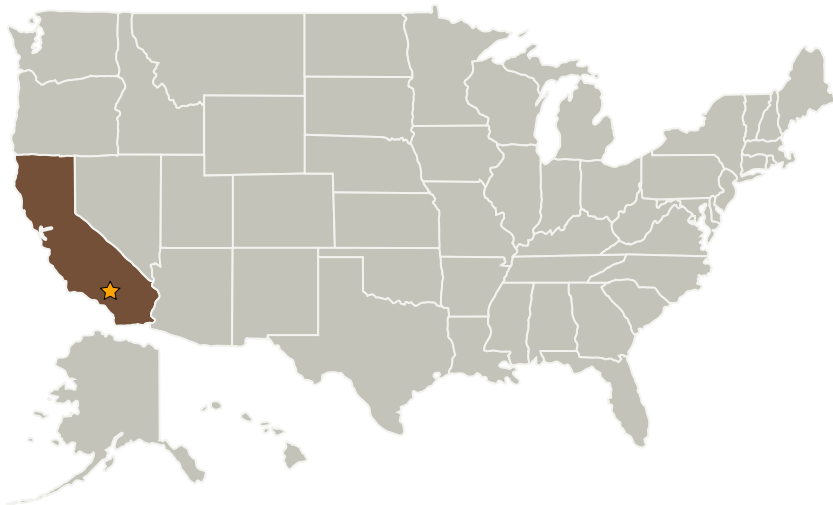
Completed Technology Project (2009 - 2010)



Project Introduction

Intelligent Fiber Optic Systems Corporation (IFOS) in collaboration with Washington State University (WSU) proposes an approach of utilizing structurally integrated, distributed optical FBG sensor/piezo actuator arrays to monitor the health of a structure with accurate interpretation of sensor signals and real-time data processing. Our method involves a dynamic response-based damage detection technique that offers a simple identification method with easy implementation. We use electrically passive, electromagnetic interference (EMI) immune, multiplexable, fiber optic sensing technology with many sensors on a single light-weight small diameter optical fiber. This is currently the most cost-effective and aerospace friendly way to overcome the sensor impoverished state of present day structures. This method has the capability of inspecting large area structures to provide global as well as local structural health information in real time. As well as providing weight reduction, the miniaturization enabled by our optical fiber technology is key to diverse spin-off applications such as for sensor matrices in NASA's extra-vehicular and planetary exploration robots as well as sensor arrays for medical applications and homeland security robotic disarming of bombs.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Armstrong Flight Research Center (AFRC)	Lead Organization	NASA Center	Edwards, California
Intelligent Fiber Optic Systems Corporation	Supporting Organization	Industry	Santa Clara, California

Primary U.S. Work Locations

California

Project Transitions

**January 2009:** Project Start**January 2010:** Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Vahid Sotoudeh

Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
 - └ TX09.4 Vehicle Systems
 - └ TX09.4.6 Instrumentation and Health Monitoring for EDL